



FBI LABORATORY ANNUAL REPORT 98





Letter from Assistant Director FBI Laboratory

This year's Annual Report focuses on the major accomplishments achieved by the FBI Laboratory during 1998.

One of the most significant was obtaining accreditation by the American Society of Crime Laboratory Directors' Laboratory Accreditation Board in September 1998 in all of the covered disciplines. With this important achievement, the FBI Laboratory is now one of more than 180 crime laboratories, worldwide, that have been accredited.

The services of the FBI Laboratory have proven to be crucial to law enforcement agencies especially in counterterrorism investigations. Over the past year, the FBI Laboratory deployed its scientific capabilities to a number of remote locations throughout the United States and around the world, including the Embassy bombings in Africa. In response to these bombings, the FBI immediately had assessment teams deployed to Africa. Explosives, hazardous devices, trace and chemistry examiners, photographers, graphics/design personnel, along with Evidence Response Teams, Special Agent Bomb Technicians, and members of the FBI's Disaster Squad were on site in both Nairobi and Dar es Salaam to provide assistance and support. In response to these bombings, the FBI Laboratory has processed over 2,280 items of evidence. In addition, the training provided by the FBI Laboratory to the Kenyan National Police Bomb Squad has been instrumental to enhancing their response capability.

During 1998, the FBI Laboratory achieved a major breakthrough in law enforcement's use of DNA. The FBI is now able to identify individuals as the source of a stain based on the DNA profile. In a significant case, a correctional officer was charged with the kidnapping and first-degree sexual assault of a woman. The FBI testified at the trial that the correctional officer was the source for DNA found on the victim's clothing. Despite the suspect having four alibi witnesses, the man was convicted. This conviction was largely due to the DNA evidence presented at the trial.

In addition, the FBI has played a leadership role in forensic research and the application of emerging technologies to address current and anticipated crime problems. During 1998, the FBI Laboratory began operation of the National DNA Index System. Through this System, DNA profiles are shared from convicted offenders and crime scene evidence submitted by state and local forensic laboratories across the United States. For example, a Texas man was arrested in 1998 for the sexual assault of two young girls in 1993 when, for the first time in Texas, law enforcement officials used a DNA database to positively link a person to a crime where the only evidence available was DNA from the crime scene. The Texas Governor publicly announced the event stating that "We now have a DNA database that proverbially allows us to find the needle in the haystack." The use of a DNA database as an investigative tool ushers in a whole new era of crime detection and prosecution. It is also important to note that approximately 25 percent of the DNA results indicate that an individual is excluded as a suspect. For example, in 1989, a violent sexual assault occurred. The defendant was convicted of the crime. However, a biological sample from the convicted offender was re-typed using mtDNA technology, and the results excluded him. Based on the mtDNA results, the defendant was subsequently released from prison.

The FBI has also worked diligently over this past year to train over 5,400 federal, state, and local personnel in forensic techniques. In addition, with the increased threat from sophisticated explosive devices, such as chemical/biological devices and large vehicle bombs, the FBI Laboratory has a commitment to provide advanced technology to the U.S. bomb technician community. During 1998, the FBI Laboratory trained its Special Agent Bomb Technicians for render-safe procedures to support them in this newly approved responsibility. In addition, efforts continue to improve the quality of training and support at the Hazardous Devices School, Redstone Arsenal, through equipment upgrades, instructor training, and facility improvements.

In an effort to provide increased effectiveness and efficiency in advanced technical capabilities, the Engineering Sections of the FBI's Information Resources Division were transferred to the FBI Laboratory on October 1998 and has become the Investigative Technologies Branch. This reorganization places all applied science and engineering activities under a single management team in the FBI Laboratory. This will allow the FBI to fully exploit applied science and engineering capabilities to support FBI national investigative priorities.

In addition, the FBI Laboratory has established partnerships with the Department of Energy (DOE), elements of the Department of Defense, and other federal, state, and local laboratories to take advantage of emerging technologies to better serve all Laboratory customers. In particular, during 1998 the FBI Laboratory signed a Memorandum of Understanding (MOU) with the DOE. This MOU supports 18 major research and development efforts in the following critical areas: Explosives Detection Technology; Forensic Evidence Analysis and Crime Scene Technology; Information Infrastructure Technology; Specialized Training; and Victim and Terrorist Identification. Agreements were established with laboratories to provide enhanced scientific support to further the FBI's hazardous material response capability research and development program and to facilitate the transfer of critical technologies to the FBI Laboratory. The FBI Laboratory also serves as the technical leader to the criminal justice system by coordinating the technical and administrative functions of a number of Scientific Working Groups (SWGs). These SWGs bring together national and international experts to develop procedures, protocols, training, and accreditation guidelines. These groups and a number of the subgroups are chaired by FBI Laboratory personnel.

After the FBI completes the new Laboratory at the FBI Academy at Quantico, Virginia, and relocates, the largest law enforcement applied science and technology enclave in the world will be established. This will provide an unprecedented opportunity for leadership and sponsorship of the application of science and technology to law enforcement and intelligence operations. Facilities will be available for the hosting of representatives from academia and other agencies' training and research. New approaches for distance learning will also be employed to disseminate applied science and engineering information. The FBI Laboratory expects to play a major leadership role in the law enforcement community by developing and supplying scientific and technical services and access to information resources.

In closing, I salute the men and women of the FBI and the law enforcement community for their efforts and accomplishments.

Donald M. Kerr



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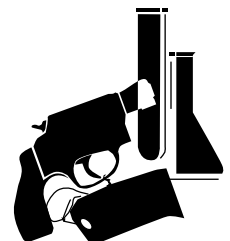
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FBI Laboratory Program Goals

Provide Forensic Services To The FBI And Any Other Duly Constituted Law Enforcement Agency.

Deploy Effective Communications, Collection And Surveillance Capabilities To Support Investigative And Intelligence Priorities.

Provide Technical and Forensic Assistance Through Research, Training, Technology Transfer And Access To Information and Forensic Databases.



FBI Laboratory Strategic Objectives

The FBI seeks to enhance the full-range of services provided by the FBI Laboratory, including forensic examinations, investigative operations support, research and development, application of information technology, and training. To accomplish these goals, the FBI has established three strategic objectives that will provide a coordinated and comprehensive applied science and engineering capability to support FBI national priorities. These three strategic objectives are:

- Fully Exploit Applied Science And Engineering Capabilities To Support FBI National Priorities.
- Improve FBI Applied Science And Engineering Capabilities.
- Lead The Application Of Applied Science And Engineering To Law Enforcement Problems.



Report

on

Operations and Accomplishments:

OPERATIONAL SUPPORT

Hazardous Materials Response

In 1996, the Hazardous Materials Response Unit (HMRU) was established within the FBI Laboratory. This unit was established in response to the threat of terrorism involving nuclear, biological and chemical (NBC) weapons and to an expanding caseload of environmental crimes. HMRU has been developing the FBI's technical proficiency and readiness for crime scene and evidence-related operations in cases involving hazardous substances including NBC materials.

The FBI believes the most effective response to NBC hazards will be provided by scientific and technical operational expertise within the FBI Laboratory which will integrate with other federal and state agencies in a unified manner. In concert with the FBI's National Security Division (NSD), as the NBC investigative program manager, the FBI Laboratory has set about developing a flexible and holistic scientific and technical response to NBC events.

During 1998 the HMRU accomplished the following:

- Provided on-scene field support for 30 occasions.
- Held a lead role for NBC field response readiness at special events such as the World Energy Conference, Superbowl, World Nike Games, etc.
- Established agreements with appropriate laboratories to provide enhanced scientific support, to further the development of the unit's research and development programs and to facilitate the transfer of critical technologies into the FBI Laboratory.
- Continued to oversee the development of the containerized field deployable laboratory. This lab will provide field confirmatory analysis capabilities for a wide range of NBC materials.
- Provided technical expertise and training in support of the Domestic Preparedness Program and FBI field offices.
- Established a program to train and equip Special Agents in all FBI field offices to respond to criminal acts involving the use of hazardous materials.

Mobile Deployable Laboratories

Throughout 1998 the FBI Laboratory continued to acquire and support the required equipment and instrumentation to support a deployable laboratory. This capability will enhance the Laboratory's ability to collect, preserve and screen potential evidentiary materials collected at major domestic and international terrorist events. The early stages of this capability were tested with the Laboratory's response to the U.S. Embassy bombings in Nairobi and Dar es Salaam.

Explosives/Bombing Program

g Hazardous Devices School (HDS), Redstone Arsenal

The Hazardous Devices School (HDS) at Redstone Arsenal, Alabama, has continued to serve the state and local law enforcement community by providing the best possible training in the safe neutralization of improvised explosive devices.

During 1998 the HDS accomplished the following:

- Hired additional instructors and acquired new robotic vehicles and classroom upgrades to include multimedia capability.
- Established several advanced robot and weapons of mass destruction (WMD) courses. Added an executive management course designed for police and fire service administrators.
- Conducted eight basic courses, training nearly 200 police or fire officers in basic bomb disposal techniques.
- Conducted 12 refresher courses, training 190 prior HDS graduates in new techniques and technologies to defeat improvised explosive devices.
- Trained over 300 federal, state, and local bomb technicians in the WMD emergency actions course. HDS is also supporting a national certification program for civilian bomb technicians.

g Training and Assistance to Public Safety Bomb Technicians

The Bomb Data Center (BDC) has continued to provide training, information, equipment and operational support to public safety bomb technicians.

During 1998 the BDC accomplished the following:

- Provided operational support to FBI field offices and state and local bomb technicians for the Embassy Bombings in Kenya and Tanzania, the Summit of the Eight, Oklahoma City Bombing, the Goodwill Games, the World Masters Games and the World Energy Conference.
- Trained 160 state and local bomb technicians at eight regional seminars and 75 federal, state and local investigators at two regional bombing crime scene schools.
- Trained 100 federal, state and local bomb technicians in advanced tools/ techniques.
- Recertified 80 field agents in demolition procedures and bomb-disposal operations.
- Acquired and distributed more than 400 advanced disruptors to state and local bomb squads.
- Organized the National Bomb Squad Commanders conference involving 130 participants. The conference focused on state and local bomb squad operational response to a WMD incident.

Evidence Response Teams

The FBI Laboratory works closely with FBI field offices to develop, train and equip Evidence Response Teams (ERT). An ERT is a group of motivated, well-trained and well-equipped personnel who specialize in organizing and conducting major evidence recovery operations. An individual ERT normally consists of a team leader and six to eight members, each having certain designated responsibilities. ERTs respond to major case situations to ensure critical evidence is identified and gathered for forensic analysis. ERTs are involved in ongoing training to develop and maintain their organizational and forensic evidence collection skills. During 1998, significant efforts were taken to provide critical supplies and equipment for ERT personnel.

Training was provided to 573 students through regional ERT training and advanced ERT in-service training held at the FBI Academy, Quantico, Virginia. In addition, field ERTs conducted over 1,000 operational responses during FY 1998.

Racketeering Records and Analysis Support

The FBI Laboratory's Racketeering Analysis Unit (RRAU) combats violence through the forensic analysis of illicit clandestine business records in the areas of drug, money laundering, gambling, loansharking and prostitution.

During 1998 the RRAU accomplished the following:

- Analyzed 128 drug record submissions for the FBI, DEA and other federal, state and local law enforcement agencies, including the Organized Crime/Drug Enforcement Task Forces, Joint Drug Intelligence Groups, the National Drug Intelligence Center and the FBI's Safe Street Program.
- Analyzed 78 racketeering submissions associated with gambling (sports bookmaking, illegal lotteries, electronic video gambling devices), loansharking and prostitution.

Special Photographic Unit

Forensic photographers from the Special Photographic Unit (SPU) provided extensive support to several international criminal and terrorism investigations, which included the bombing of the American Embassy in Tanzania, a bombing in Budapest, Hungary and a terrorist bombing in Athens, Greece. In Tanzania, by deploying a portable digital darkroom, the SPU photographers captured digital images of the bombing site and facilitated the transmission of these images to the Strategic Information Operations Center (SIOC) for immediate analysis by FBI explosives experts. Additionally, the crime scene photographs provided by the SPU photographers assisted in the investigation of the perpetrators of the bombing, as well as in the identification of the explosives used in the blast.



During 1998 the SPU accomplished the following:

- Completed 656 photographic assignments, processed over 1,400,000 images and provided photographic examination support for 341 cases.
- Processed over 80 aerial photographs in support of the following events: 1998 Super Bowl, 1998 Major League Baseball All-Star Game, 1999 World Alpine Ski Championships, the Southern Governors' Conference, 1998 Nike Games, World Energy Council, 1998 Goodwill Games, Ronald Reagan Building Dedication, Technological Olympics and the 2002 Winter Olympics.
- Provided photographic equipment to FBI field and headquarters entities, which included traditional and digital camera equipment, darkroom equipment and digital imaging stations.
- Provided five FBI field offices to new camera equipment.

Computer Analysis Response Team

The ever-increasing use of computers and the rapidly developing technology used by today's computer systems have dramatically increased the volume and complexity of computer evidence that the FBI acquires through its investigations. These investigations, including health care fraud, child pornography, terrorism, drugs, financial institution fraud, public corruption, and national security, as well as every other investigative classification for which the FBI is responsible, yield an immense volume of computer evidence that may range from outdated to state-of-the-art technology. During 1998 the Computer Analysis Response Team (CART) provided forensic examinations and on-site field support to all FBI investigations and programs where computers and storage media were encountered.



During 1998, the CART accomplished the following:

- Processed over 2,400 computer forensic examinations. The majority of these examinations were associated with the Violent Crime Major Offenders and White Collar Crime programs.
- Provided forensic examinations and on-site field support in cases dealing with child pornography and innocent images on the Internet. Provided support for 86 cases involving innocent images in addition to over 49 pornography cases.

Investigative and Prosecutive Graphic Unit (IPGU)

The FBI Laboratory's Investigative and Prosecutive Graphic Unit (IPGU) provides a wide array of graphic and digital imagery related support in the furtherance of FBI investigations and prosecutions.

During 1998, the IPGU accomplished the following:

- Provided on-scene support for FBI major cases, both national and international.
- Provided assistance for several cases that will be presented in an electronic format in the federal court systems.

Disaster Squad

During 1998, the FBI's Disaster Squad, composed of highly trained and experienced experts, assisted in identifying American victims of the U.S. Embassy bombings in Nairobi, Kenya, and in obtaining antemortem records of victims in the Swissair crash off the coast of Nova Scotia, Canada.

DEPLOYMENT OF FORENSIC TECHNIQUES AND INFORMATION TECHNOLOGIES

The FBI has had a leadership role in forensic research and the application of emerging technologies to address current and anticipated crime problems.

National Integrated Ballistic Information Network (NIBIN)

The FBI and Bureau of Alcohol, Tobacco, and Firearms (ATF) signed an agreement to consolidate ballistic identification technologies into one joint federal program called the National Integrated Ballistic Information Network (NIBIN). One of the primary goals of the NIBIN Program is to achieve interoperability between the two ballistics imaging systems (formerly known as DRUGFIRE and IBIS). NIBIN is an automated computer technology that is capable of making otherwise unidentified links between firearms-related evidence (cartridge cases, fired bullets, and firearms.) This system was developed to assist state and local law enforcement agencies in the fight against violent crime.

- g NIBIN is operational in approximately 125 sites within the United States with another 50 laboratories expected to install NIBIN systems by the end of 1999.
- g Nationwide, over 2,600 criminal shooting cases have been linked together. Currently, more than 167,000 images of fired cartridge cases and bullets have been entered into the NIBIN system. The linking of this evidence from crime scenes provides police with investigative leads that would otherwise have gone undetected.

Combined DNA Index System (CODIS)

The CODIS Program provides software and support services to enable state and local laboratories to establish databases of convicted offenders, unsolved crime scenes, and missing persons. CODIS allows these forensic laboratories to exchange and compare DNA profiles electronically, thereby linking serial violent crimes (especially sexual assaults) to each other and to identify suspects by matching DNA from crime scenes to convicted offenders.

- g CODIS has recorded over 400 matches to date linking serial violent crimes to each other or identifying suspects by matching crime scene evidence to known convicted offenders. These matches have aided almost 600 violent crime investigations.
- g CODIS is installed in 94 laboratories in 41 states and the District of Columbia.
- g All 50 states have enacted DNA database laws requiring the collection of a DNA sample from specified categories of convicted offenders.
- g More than 400 federal, state, and local DNA analysts have received CODIS training.
- g More than \$16 million in grant funding transferred to the Bureau of Justice Assistance has been awarded to the states to establish, develop, and upgrade computerized identification systems compatible with CODIS, the FBI's National Crime Information Center (NCIC), and automated fingerprint systems compatible with the FBI's Integrated Automated Fingerprint Identification System (IAFIS).
- g The FBI Laboratory provided CODIS software and training to criminal justice agencies in other countries.



World Forensic Automated Counterterrorism System (World FACTS)

The FBI has completed the initial development of a forensic capability known as World FACTS that will share information on evidence (explosives, firearms and latent fingerprints) associated with terrorism. The short-term goal was to develop a capability for transmitting forensic data via high-speed telecommunications. This goal was accomplished with the deployment of a pilot test system to Italy that facilitates the transmission of forensic data associated with explosives and firearms. The initial phase has been directed at the countries comprising "The Eight" which includes Canada, France, Germany, Italy, Japan, Russia and the United Kingdom. This program is being developed by the FBI in cooperation between the Laboratory and National Security Divisions. Future plans include the addition of other forensic applications (such as CODIS, the DNA database software) into the World FACTS Program.

National DNA Index System (NDIS)

The FBI Laboratory began operation of the National DNA Index System on October 13, 1998. NDIS is the final level of the CODIS system and it supports the sharing of DNA profiles from convicted offenders and crime scene evidence submitted by state and local forensic laboratories across the United States. The DNA Identification Act of 1994 (part of the Violent Crime Control and Law Enforcement Act of 1994) authorized the Director of the FBI to establish this national database. Now that all 50 states have laws authorizing the establishment of state DNA databases and the collection of DNA samples from convicted offenders, the FBI Laboratory encourages all states to participate in NDIS.

Implementation of Sexual Assault Response Team (SART) Approach in the District of Columbia

The FBI has been collaborating with representatives from the Department of Justice, the District of Columbia Rape Crisis Center and the United States Attorney's Office to establish a sexual assault response team (SART) for the Washington metropolitan area. The SART concept is designed to provide a team approach and compassionate, coordinated response between the sexual assault forensic examiners, including Sexual Assault Nurse Examiners (SANE), law enforcement officers, victim advocates, judiciary personnel and crime laboratory personnel in cases of sexual assault and abuse. The concept promotes interdisciplinary cooperation to achieve optimal emotional and medical support for the victim; quality evidence collection, preservation, and analysis of evidence at the crime scene, the medical facility and crime lab; coordinated investigations; and successful prosecution.

It is anticipated that the implementation of the SART/SANE program in the District of Columbia will facilitate the collection of evidence in accordance with well-established protocols used by other successful SART/SANE programs. Consequently, highly informative DNA profiles may be obtained for entry into CODIS. The FBI has assisted in the development of a SANE program for children at the Children's National Medical Center. Plans are to establish a similar program for adult sexual assault victims in 1999.

Federal Convicted Offender DNA Program

The FBI has begun planning for the implementation of the Federal Convicted Offender DNA Program to begin in FY 2000. The FBI is currently pursuing legislative authority for implementation of this program. The FBI Laboratory will coordinate this program with other components in the DOJ, including the Bureau of Prisons, U.S. Marshal's Service and U.S. Attorneys.



Automated Paint Database— Paint Data Queries (PDQ)

Through a cooperative agreement between the FBI and the Royal Canadian Mounted Police (RCMP), an international forensic automotive paint database is being established. This system augments the current National Automotive Paint Database by enhancing the identification of the make, model and year of any questioned paint. The system known as Paint Data Queries (PDQ) has three distinct functions:

- g Assists with the identification of any unknown suspect vehicle.
- g Serves as a statement regarding paint uniqueness for increased credibility in court.
- g Provides a tool for examiners to stay current.

Automated Fingerprint Identification System (AFIS)

During 1998 the FBI Laboratory deployed operationally the Integrated Automated Fingerprint Identification System (IAFIS)—Special Latent Cognizant Files (SLCF) capability by jointly creating with the National Security Division (NSD) and the Criminal Investigative Division (CID) actual 10-print fingerprints of individuals associated with specific criminal activity. The LFS has effected 40 latent fingerprints using this capability. One case of special interest involved foreign individuals conducting illegal bank transactions in which a latent fingerprint was identified. This single latent fingerprint identification using the IAFIS SLCF capability has resulted in more than 165 additional latent fingerprint identifications being effected against the same individual in several related, but separate incidents. This individual was not known to have any involvement with this matter until the initial IAFIS latent fingerprint identification was effected.

The FBI Laboratory has also been using another AFIS capability that provides forensic latent print examiners the ability to initiate a latent fingerprint search from a workstation at HQ against the Western Identification Network (WIN) (WIN consists of nine states) and the commonwealths of Virginia and Pennsylvania.

SCIENTIFIC ANALYSIS OF PHYSICAL EVIDENCE AND EXPERT TESTIMONY

The FBI Laboratory conducts examinations of physical evidence, free of charge, for all duly constituted law enforcement agencies in the United States that do not have access to the crime laboratory equipment or expertise necessary to perform the requested examination. Statistical data for 1998 (Actuals) are delineated below:

Laboratory Statistics	1998 Actuals
Specimens Submitted	298,858
Examinations Performed	583,366
Latent Fingerprint Comparisons	1,161,551
Examinations Supporting	
- Violent Crimes	173,091
- White Collar Crime	109,393
- Organized Crime/Drugs	111,735
- Domestic Terrorism	11,392
Suspects Identified by Latent Fingerprint Exams	431

Decade of DNA

In December of 1988, the FBI Laboratory began conducting DNA analysis on items of evidence stained with body fluids such as blood or semen. Since the initial implementation of the first DNA typing procedure, dramatic changes have occurred to improve and expand DNA testing. Advances were made due to the combined efforts of scientists from public forensic laboratories, academia, and industry. Battles waged in the courtroom were won by proponents of the powerful technology such that today results from DNA analyses are commonly given in testimony in courts throughout the United States and the international law enforcement community. DNA typing can now be used to identify the source of a body fluid stain, and it is considered a genetic "fingerprint." DNA profiles can be obtained from convicted offenders and compared to unsolved DNA profiles of unsolved crimes, making it an extremely valuable investigative tool. FBI scientists and examiners, who were called to testify in various admissibility hearings and subsequent trials, often relied on the support of outside scientists who testified as expert witnesses concerning issues of molecular biology and population statistics. Several of these scientists authored research papers that serve as the foundation for the standard protocols used today in the majority of the forensic DNA laboratories in this country. This research effort was often coordinated by FBI scientists at the Forensic Science Research and Training Center. Working with this group of academicians, the FBI has successfully established itself as a leader in the field of forensic DNA technology.

Additionally, throughout the past 10 years, a small cadre of attorneys have assisted the FBI in educating the numerous prosecutors concerning DNA testing and the presentation of this evidence in court. All have been instrumental in assisting the FBI in various cases as well as ensuring that other prosecutors are well equipped to ensure admissibility of DNA. Each of these attorneys has authored articles sharing their experience and advice to both investigators and prosecutors who have had to grapple with the myriad of issues surrounding forensic DNA analysis over the past 10 years.

In November 1998, the FBI Laboratory celebrated a “decade of DNA” during the annual meeting of the Combined DNA Index System (CODIS) Users Group. The CODIS system is the national system that allows forensic laboratories to store and match DNA profiles from known offenders. CODIS also provides a means for laboratories to store and match DNA profiles derived from biological crime scene evidence. During this meeting, FBI Director Louis Freeh honored several individuals who have been instrumental in supporting the FBI’s efforts in the establishment of DNA technology as a critical law enforcement tool.

New Test for Semen Identification

The FBI Laboratory DNA Analysis Unit I (DNAU I) implemented a new technology that greatly simplifies the identification of evidentiary semen stains. Identification of human semen in extracts of suspected semen stains relies on the detection of a protein known as P30. The new test procedure detects P30 in one simple step using a system similar to the testing procedure used in home pregnancy tests. This eliminates the more cumbersome and time-consuming analyses previously conducted. This testing will significantly speed the time involved in the initial serological screening that is done to identify those stains suitable for later DNA testing.

DNA Casework Profiles Added to the National DNA Index

The DNAU I began the addition of hundreds of DNA profiles to the National DNA Index of the Combined DNA Index System. This information can be compared with that in the various state databases that contain profiles from convicted offenders. It is anticipated that the addition of this information will lead to similar results as occurred in the following Wisconsin Serial Rapist case:

WISCONSIN SERIAL RAPIST CASE

In 1995, four unsolved Wisconsin rapes were linked through DNA analysis. These profiles had been generated in the FBI Laboratory. These profiles were sent to the Wisconsin State Crime Laboratory on October 14, 1998. Within an hour of receiving the information, a search of the Wisconsin Convicted Offender DNA database identified a subject. The subject was arrested at a meeting with his parole officer on October 16 and confessed to one of the rapes before requesting a lawyer.

Mitochondrial DNA (mtDNA) Program

The FBI Laboratory has implemented a mitochondrial DNA (mtDNA) program, which expanded the capability of typing forensic samples with very little DNA, such as hairs, degraded bones and teeth. The FBI Laboratory is the first forensic laboratory to use this technology in criminal case work. Request for the FBI’s protocol have been received from laboratories throughout the world. The FBI currently has testified to mtDNA in eight states.

RESEARCH AND DEVELOPMENT (R&D) EFFORTS

The FBI Laboratory is recognized as a world leader in the scientific analysis of evidence towards the solution of crime. Since its inception, the FBI Laboratory has consistently strived to enhance its services to the law enforcement and criminal justice communities through the research, development, and deployment of new or advanced forensic techniques and protocols

Critical Technologies for Targeted R&D:

During 1998, the FBI Laboratory has identified and pursued several major R&D efforts. In support of these R&D efforts, the FBI used two major acquisition vehicles. The primary approach was through a Broad Agency Announcement (BAA). Over 600 proposals were received, and contracts for 11 R&D projects were awarded during 1998. The second vehicle was through a memorandum of understanding (MOU) between the FBI and the United States Department of Energy (DOE). This MOU was signed during 1998 and funding was provided for 18 major R&D projects. The following highlights the critical technology initiatives for targeted R&D efforts:

g Explosives Detection Technology

This new technology will identify traces of explosive residue on suspect items during threat assessment, investigations or in the examination of suspected packages. The technology will be used to screen postblast evidentiary items. Specific R&D projects that will support this technology include: Man-Portable Air Defense Systems (MANPADS), Hand Held Ion Mobility Spectrometer, Explosive Damage to Metals and Standoff Detection of Explosives Using Microwave Spectroscopy.

g Forensic Evidence Analysis and Crime Scene Technology

The collection, preservation, and timely analysis of forensic evidence is critical in terrorism investigations. This initiative will develop new, improved and validated analytical methods for the forensic comparison of evidentiary materials recovered from explosive devices (pre- and postblast) such as plastic, paint, metal, wires, tapes, explosives and physiological fluids. Results will then be compared with similar items recovered from suspects to help produce investigative leads. These technologies are essential for laboratory confirmation of trace explosives residue on evidentiary items. Field-portable crime scene robots and 3-D vision will be used for the collection and preservation of physical evidence at hazardous crime scenes.

g Information Infrastructure Technology

R&D efforts are being pursued to develop and evaluate secure technologies capable of improving the FBI Laboratory's information infrastructure to deal with the massive amounts of forensic evidentiary material recovered during terrorist investigations or crime scene searches. Efforts are ongoing to develop automated reference collections for common components used improvised explosive or hazardous devices. In addition, development methods of capturing and preserving institutional knowledge are being pursued.

g *Specialized Training*

Interactive CD-ROM and Internet/Intranet training modules are being developed to provide training in newly developed forensic methods. These training modules will also be shared with other law enforcement agencies and first responders. Training to be provided includes:

First Responder Web-Based Training

A web-based interactive training module for first responders and medical and ERT personnel on the hazards and proper techniques for the safe handling of chemically and biologically contaminated evidence and persons.

Distance Learning Modules

An interactive media for distance learning to develop a crime scene management interactive, Intranet/Internet training course.

g *Victim and Terrorist Identification*

Victim or suspect identification or both plays a vital role in crisis and consequence management. Fingerprint and DNA technologies also play an important role in other crimes as well. This research will improve latent fingerprint visualization technologies to aid in the identification of victim or terrorist suspects. The research may extend to the determination of survivability of latent fingerprints on pipe bombs. The development of automated methods for the preparation of forensic DNA samples will speed the identification of victims or suspects. It may be possible to recover mtDNA from latent fingerprints.



Hazardous Materials Response

The Hazardous Materials Response Unit (HMRU) maintains an R&D program to establish a robust capability for conducting forensic analyses in terrorism and other criminal investigations involving hazardous materials. Extramural R&D projects supported during 1998 included the continued work on the containerized field-deployable laboratory and the development of a man-portable gas chromatograph/mass spectrometer and a hand reader for immunochromatographic assays. In addition, HMRU is working on new methods of DNA analysis for the rapid identification of biological pathogens and new methods for the identification of hazardous chemical substances in closed containers.

Bomb Data Center (BDC)

Working with the National Institute of Justice and the Technical Support Working Group, the BDC has been actively involved in R&D projects seeking to increase the technical capabilities of public safety bomb squads to safely detect, diagnose, and defeat bombs, with an emphasis on chemical and biological devices and vehicle bombs. This R&D partnership has produced several successes that include a computerized robotic trainer/simulator, an advanced vehicle bomb disablement system and computer-based interactive training modules.



Drug-Facilitated Rape Issues

In conjunction with the Department of Justice, the Chemistry Unit has undertaken the lead role in a nationwide effort of addressing the issues surrounding drug-facilitated sexual assault. Primarily, work is underway with other forensic toxicologists to develop guidelines and recommendations for the collection, submission, and analysis of biological specimens for investigations of these crimes. The effort thus far has led to the development of a tip sheet whose target audience includes law enforcement and medical personnel. This information was distributed to governors' offices, state prosecutors' offices, and police departments in every state in the United States. The nationwide training of forensic toxicologists is ongoing.

Additionally, the FBI Laboratory is the primary author of a manuscript due to be published in the January 1999 issue of the *Journal of Forensic Science*, which provides guidelines and recommendations for toxicology exams about which drug-facilitated rape is suspected.

Computer Analysis Response Team (CART)

The CART Unit's mission includes the collection and examination of computer evidence or evidence that is stored in an electronic form. Today, more than ever, crucial evidence pertaining to an investigation is found in electronic formats, and it must be processed such that the case agent can review and analyze its pertinence to the investigation.

The use of electronic communications, information processing, and electronic data storage is increasing on a daily basis. The amount of evidence submitted is also expected to increase exponentially, as larger electronic storage capacities continue to be developed.

g Automated Computer Examination System (ACES)

The CART has been in the process of developing the ACES. The initiation of the project was built on the premise that CART examiners need a technically advanced, fully integrated tool set that allows for the exploitation of storage media from many different types of computers. The tool set will include a depository for subsets of extracted data as well as a means of off-loading the pertinent data for review. This system is accessed from a workstation, and a portable client will provide tracking and summary reports of examinations conducted. The ACES project began during fall 1995 and implementation is expected in spring 1999. ACES was also developed with state and local law enforcement in mind, thus an autonomous client for state and local law enforcement is also being developed for implementation in fall 1999.

g Golden Gate

The CART has also realized the need for a more streamlined examination process when dealing with data storage tape backups and certain operating systems. As a result, a project (Golden Gate) is currently underway to bridge the gap between the potpourri of operating systems and devices to provide a turnkey computer forensics examination solution. This solution provides for the deployment of an arsenal of hardware, software, and methodologies that will enable CART Examiners to examine any flavor of UNIX on most types of computer media. Currently, the Golden Gate Project, with its hardware and software components, provides plug-and-play evidence capabilities as well as a bridge between UNIX- and Windows-based systems.

g Computer-Based Training (CBT)

The CART is in the final stages of developing a CBT & Resource CD-ROM compiled of a knowledge base compilation of UNIX information, forensic techniques, and tools as well as Standard Operating Procedures. The user-friendly knowledge base will provide the CART Examiners at FBIHQ and the field divisions a resource for UNIX information that will be available in the lab environment and at a search site. Implementation of this CBT is expected as early as February 1999.

Latent Print Automation

The FBI's Latent Fingerprint Program is considered the leading authority on all forensic aspects of human skin friction ridge analysis (fingerprints, footprints, and palm and toe prints). The advent of computer-based fingerprint systems, coupled with new and improved technology, has given the FBI an additional tool to more effectively solve crimes. These computer-based fingerprint systems include digital latent print imaging and photographic equipment, specialized software for latent print processing and enhancement, the FBI's Integrated Automated Fingerprint Identification System (IAFIS) and other commercially available Automated Fingerprint Identification Systems.

The FBI Laboratory is continuing to perform R&D with the FBI's Criminal Justice Information Services (CJIS) Division on the IAFIS project. This activity involves the fingerprint feature extraction algorithm, the latent fingerprint search-and-match algorithms, and the development of the human-machine interface for the IAFIS Latent Workstations that every latent fingerprint examiner will use to perform their job as of 1999.

LABORATORY TRAINING CONDUCTED

The FBI Laboratory provides training to FBI personnel and forensic scientists from state and local crime laboratories. State and local crime laboratory and law enforcement personnel receive FBI Laboratory training in forensic science courses, some of which are not available anywhere else in the country. These specialized forensic classes are conducted at the FBI Academy, the Hazardous Devices School, regional and local training programs, and symposia. In addition, the FBI Laboratory sponsors international training symposia to exchange the technical and scientific information on topics of interest to the forensic community.

During 1998, the FBI trained over 5,400 students in basic and advanced forensic science courses including Specialized Forensic In-Services and Symposia; ERT Schools; the FBI's National Academy; CART, Latent Fingerprints, Bomb Technician Training and the Hazardous Devices School.

Training Programs and Symposia for Crime Laboratory Practitioners and Law Enforcement Personnel	
Training Programs & Symposia	1998 Actuals
FBI In-Services Conducted	22
ERT Schools Conducted	22
Specialized Forensic Classes Conducted	26
Seminars, Conferences, Symposia	13
Bomb Technician Regional Seminars Conducted	8
Regional Bombing Crime Schools Held	2
Hazardous Devices Schools Conducted	20
Latent Fingerprint Schools Held	42
CART In-Services Held	5
Computer Specialists Search & Seizure In-Services Held	3
FBI In-Services Student Trained	444
ERT Road Schools Students Trained	573
National Academy Students Trained	1080
Specialized Forensic Classes Students Trained	492
Seminars, Conferences, Symposia Attendees	706
Bomb Technician Students Trained	470
Federal, State, and Local Investigators Trained	75
Hazardous Devices School Students Trained	690
Latent Students Trained	787
CART Students Trained	106

ADMINISTRATIVE AND OTHER ISSUES

Laboratory Accreditation

The Crime Laboratory Accreditation Program, established by the American Society of Crime Laboratory Directors, is a voluntary program in which any forensic laboratory may participate to demonstrate that its management, personnel, operations, procedures, equipment, physical plant, security, health and safety procedures meet established standards. The program is managed by the American Society of Crime Laboratory Directors' Laboratory Accreditation Board (ASCLD/LAB), which is responsible to the delegate assembly composed of the directors of all accredited laboratories. Accreditation is part of a laboratory's quality-assurance program, which includes proficiency testing, continuing education and other programs to help the laboratory provide better service to the criminal justice community.

- g The FBI obtained accredited by the ASCLD/LAB on September 11, 1998.
- g The FBI Laboratory is now one of more than 180 crime laboratories, worldwide, that have been accredited by the ASCLD/LAB.
- g Accreditation has been provided in the following disciplines: controlled substances, DNA, serology, firearms and toolmarks, latent prints, questioned documents, toxicology and trace evidence.
- g Accreditation is granted for a period of five years provided that a laboratory continues to meet the standards during this period.

Laboratory Relocation

The FBI has undertaken a major initiative to relocate the FBI Laboratory from its present space in the FBI Headquarters (FBIHQ) Building in Washington, D.C., to a new, stand-alone facility on the campus of the FBI Academy, Quantico, Virginia.



- g The FBI broke ground in fall 1997 on the parking structure.
- g Construction is expected to be completed by summer 2001.
- g Occupancy of the new facility will be phased in during summer/fall 2001.

Scientific Working Groups

The FBI Laboratory serves as the technical leader to the criminal justice system by coordinating the technical and administrative functions of a number of Scientific Working Groups (SWGs). These SWGs include the Scientific Working Group on DNA Matters; Scientific Working Group on Materials Analysis; Scientific Working Group on Friction Analysis, Study and Technology; Scientific Working Group on Imaging Technologies; Scientific Working Group on Digital Evidence and Scientific Working Group on Bombing Matters. The Scientific Working Group on DNA Matters, for example, was responsible for establishing national guidelines for the analysis and reporting of DNA data. These working groups bring together national and international experts to develop procedures, protocols, training and accreditation guidelines. These groups and a number of the subgroups are chaired by FBI Laboratory personnel.

Major accomplishments of the SWGs include:

- g Developed SWG Materials Analysis Trace Evidence Guidelines. These guidelines will likely set the standard for trace evidence examinations in forensic laboratories.
- g Served as the lead organization in the formation and operation of the SWG on Imaging Technologies to facilitate the integration of new imaging technologies and systems within the Criminal Justice System by providing definitions and recommendations for the capture, storage, processing, analysis, transmission and output of images. The group includes representatives of law enforcement agencies at the federal, state and local levels, as well as individuals from the academic and commercial arenas. In August 1998 the SWG on Imaging Technologies generated a draft set of general guidelines detailing the proper use of imaging technologies in law enforcement applications. This represents the first time such a set of guidelines has been developed for use by law enforcement organizations across the country.

Federal DNA Advisory Board

The DNA Identification Act of 1994 authorized the creation of a DNA Advisory Board to make recommendations to the FBI Director on quality control standards for laboratories conducting DNA analyses. The DNA Advisory Board is composed of 16 members representing federal, state, local and private forensic laboratories and the disciplines of bioethics, molecular biology and genetics and population genetics.

In accordance with the Act and on the basis of the Board's recommendation, the FBI Director has issued Quality Assurance Standards for Forensic DNA Testing Laboratories that were effective October 1, 1998.

Also, on the basis of the Board's recommendation, the FBI Director has issued Quality Assurance Standards for Convicted Offender DNA Databasing Laboratories that were effective January 1, 1999.